

## ASSIGNMENT 4

Textbook Assignment: "Heating Systems" (continued), chapter 4, pages 4-4 through 4-36.

---

- |   |   |
|---|---|
| <p>4-1. An installed equipment item and a component of a system, consisting of an extended or finned heat transfer surface, and a propeller or blower fan to create an airflow through it is known as what type of heating unit?</p> <ol style="list-style-type: none"><li>1. Central heater</li><li>2. Central heating system</li><li>3. Unit heating system</li><li>4. Unit heater</li></ol> <p>4-2. What type of direct-fired unit generates heat directly by an electrical coil or by a combustible fuel?</p> <ol style="list-style-type: none"><li>1. Space heater</li><li>2. Central heater</li><li>3. Space distribution heater</li><li>4. Unit heating system</li></ol> <p>4-3. Of the following types of heaters, which one is NOT a type of unit heater?</p> <ol style="list-style-type: none"><li>1. Suspended horizontal discharge</li><li>2. Suspended vertical discharge</li><li>3. Vertical forced warm-air</li><li>4. Horizontal type of blower unit</li></ol> <p>4-4. Space heaters are desirable as a means of providing heat to a small space because of their simplicity of construction, low initial cost, and reasonable fuel consumption.</p> <ol style="list-style-type: none"><li>1. True</li><li>2. False</li></ol> | <p>4-5. One kilowatt equals a total of how many Btu per hour?</p> <ol style="list-style-type: none"><li>1. 3,415</li><li>2. 2,775</li><li>3. 2,225</li><li>4. 1,775</li></ol> <p>4-6. Electric space heaters are operated manually with an ON-OFF switch or automatically with a</p> <ol style="list-style-type: none"><li>1. humidstat</li><li>2. thermostat</li><li>3. rheostat</li><li>4. flurostat</li></ol> <p>4-7. What are the two types of gas heaters?</p> <ol style="list-style-type: none"><li>1. Butane and propane</li><li>2. Manual and automatic</li><li>3. Direct fired and indirect fired</li><li>4. Vented and unvented</li></ol> <p>4-8. A vented gas heater is preferred over an unvented heater because</p> <ol style="list-style-type: none"><li>1. the flame burns in a open combustion chamber</li><li>2. the flame bums in the lower portion of the burner</li><li>3. there is less danger of carbon monoxide poisoning</li><li>4. there is less danger of explosion</li></ol> |
|---|---|

4-9. Unvented gas heaters should be used in well-ventilated areas to

1. remove sulfur deposits
2. remove carbon monoxide produced by the gas flame
3. comply with the American Gas Association (AGA) requirements
4. comply with the NAVFAC DM3

4-10. Approximately how many gallons of water is produced when 1,000 cubic feet of natural gas is burned?

1. 4
2. 8
3. 12
4. 16

4-11. Horizontal flue pipes for vented gas heaters should have an upward pitch of at least how many inches per foot?

1. 1
2. 2
3. 3
4. 4

4-12. Oil is fed to a natural draft pot still burner that is located at the

1. top of the burner, at the center
2. bottom of the burner, either at the center or on the sides
3. end of the perforated sleeves
4. middle of the left side of the burner

4-13. The flame in a perforated sleeve burner should be what color?

1. Blue
2. Yellow
3. Green
4. Red

4-14. What is the only safety device on an oil-fired space heater?

1. Atmospheric vaporizing type of burner
2. Safetronic diffuser
3. Fuel level control valve
4. Draft diverter

4-15. The draft produced by a chimney depends upon the height of the chimney and what other factor?

1. Width of the chimney
2. Temperature of the flue gas
3. Temperature of the outside air
4. Difference between the flue gas and the outside air

4-16. On what two factors does the operation of the draft regulator depend?

1. Balance and free action
2. Balance and counterbalance
3. Downdraft and updraft
4. Updraft and free action

4-17. Which of the following conditions may result in poorly working burners?

1. Chimney that is too high above the roof line
2. Chimney that is not high enough above the roof line
3. Face of the damper is not plumb
4. Counterweight placed on the damper

- 4-18. What is the major advantage of using copper tubing with heat installations?
1. It is not affected by heat
  2. It is maintenance free
  3. It requires fewer fittings
  4. It eliminates the need for a tubing bender
- 4-19. The burner goes out on a perforated sleeve burner. Which of the following conditions is NOT a probable cause?
1. Insufficient oil flow
  2. Struck needle valve
  3. Oil valve not level
  4. Improper fuel
- 4-20. A gas-fired space heater has a humming sound in the solenoid. What condition is the most probable cause?
1. Incorrect gas pressure
  2. Malfunctioning limit switch
  3. Incorrect current
  4. Solenoid installed backwards
- 4-21. What are the two types of warm-air heating systems?
1. Gravity and forced-air
  2. Positive and negative
  3. Automatic and semiautomatic
  4. Central and dispersed
- 4-22. What is the most common problem with a gravity type of warm-air system when installed at floor level?
1. Heat insulation needed above the furnace top
  2. Return-air opening is too small at the floor
  3. Lack of a positive-pressure fan
  4. Undersized jacket at the floor
- 4-23. What component installed in the forced warm-air system allows for smaller ducts?
1. Return-air jacket
  2. Humidifier
  3. Positive pressure fan
  4. Negative pressure fan
- 4-24. What component of a forced warm-air system joins the main truck duct?
1. Duct extension
  2. Sloping duct
  3. Blower
  4. Plenum
- 4-25. An objectionable noise will result at supply diffusers when room air velocities exceed 25 to 35 feet per minute (fpm).
1. True
  2. False
- 4-26. What type of distribution is provided by a diffuser that discharges through a wall?
1. Horizontal
  2. Vertical
  3. Lateral
  4. Cross wind
- 4-27. What are the two types of duct layout?
1. Warm air and cold air
  2. Plenum and full
  3. Individual or trunk and branch
  4. Vertical and horizontal

- 4-28. Warm-air pipes are called "leaders."
1. True
  2. False
- 4-29. Forced warm-air systems usually have what register temperature range?
1. 100°F to 125°F
  2. 125°F to 150°F
  3. 150°F to 180°F
  4. 180°F to 210°F
- 4-30. Outlet velocities of forced warm-air systems at registers may be as high as
1. 350 fpm
  2. 400 fpm
  3. 450 fpm
  4. 500 fpm
- 4-31. What are the three compartments in a gas-fired furnace?
1. Return air, combustion enclosure, and fuel compartments
  2. Blower, filter, and warm-air compartments
  3. Return air, warm-air, and the combustion and fuel compartments
  4. Blower, heat exchanger radiator, and combustion air compartments
- 4-32. The compartments and assemblies of a gas-fired furnace may be broken down into a total of how many units?
1. Five
  2. Six
  3. Three
  4. Four
- 4-33. What assembly includes the gas valves, pressure regulator, and those parts that automatically control the flow of gas to the pilot and main burner?
1. Blower
  2. Furnace casing
  3. Burner
  4. Gas manifold
- 4-34. What type of burner is usually used with a gas-fired furnace?
1. Hillary
  2. Thompson
  3. Bunsen
  4. Taylor
- 4-35. What gas burner control should be installed first?
1. Gas pressure regulator
  2. Manual gas cock or valve
  3. Pilot light
  4. Thermocouple relay
- 4-36. What type of gas pressure regulator is generally used in a domestic gas-heating system?
1. Spring controlled
  2. Diaphragm
  3. Solenoid
  4. Vacuum

- 4-37. What condition causes the pressure regulator to close?
1. Burner pressure falls below the desired amount
  2. Supply pressure is set above the desired amount
  3. Burner pressure is set above the desired amount
  4. Supply pressure falls below the desired amount
- 4-38. The adjusting screw for setting the pressure regulator is at what location?
1. On the bottom of the regulator
  2. On the side of the regulator
  3. On the top of the regulator
  4. On the lead-in to the regulator
- 4-39. What design feature distinguishes the recycling solenoid gas valve from a standard solenoid gas valve?
1. Manual recycling switch
  2. Recycling diverter
  3. Recycling valve
  4. Automatic recycling device
- 4-40. The primary feature of the diaphragm valve is the extreme valve noise made when opening or closing.
1. True
  2. False
- 4-41. What component of a gas-fired furnace produces an electric current when it is hot?
1. Thermocouple
  2. Resistor
  3. Rheostat
  4. Conductor
- 4-42. In the automatic gas burner system, the thermocouple is installed next to the
1. diaphragm valve
  2. pressure regulator
  3. pilot light
  4. conversion burner
- 4-43. What unit shuts off the gas when the temperature inside the heating unit becomes excessive?
1. Thermocouple control relay
  2. Thermocouple
  3. Diaphragm valve
  4. Limit control
- 4-44. What unit reduces downdrafts and updrafts that interfere with pilot and burner operation?
1. Draft diverter
  2. Draft subverter
  3. Draft converter
  4. Draft inverter
- 4-45. What are the three compartments of an oil-fired furnace?
1. Burner, combustion and radiating, and blower
  2. Combustion, radiating and burner, and blower
  3. Blower, combustion and burner, and radiating
  4. Radiating, blower and burner, and combustion

- 4-46. What type of pressure is used to atomize the oil in a gun type of domestic oil-burner?
1. Electrical
  2. Differential
  3. Pneumatic
  4. Fuel oil
- 4-47. What is the usual oil pressure for the domestic oil burner?
1. 75 psi
  2. 100 psi
  3. 125 psi
  4. 150 psi
- 4-48. What is the most common type of fuel unit used for oil burners?
1. Y-type, two stage
  2. W-type, two stage
  3. T-type, two stage
  4. L-type, two stage
- 4-49. An electric transformer is required to step up line voltage to approximately 10,000 volts to cause a spark to jump between the ignition electrodes.
1. True
  2. False
- 4-50. What is the speed of the atomizing cup in the horizontal rotary type of burner?
1. 2,350 rpm
  2. 3,450 rpm
  3. 4,530 rpm
  4. 5,430 rpm
- 4-51. What is the purpose of the oil burner control system?
1. To provide automatic, safe, and convenient operation
  2. To maintain the desired room temperature
  3. To start the burner as needed
  4. To provide an electrical connection between the thermostat and the burner
- 4-52. Of the following controls, which one controls the operation of the fire so the temperature and pressure of the heating plant never exceed safe operating limits?
1. Primary
  2. Limit
  3. Fan
  4. Thermostat
- 4-53. The human hairs in a humidity-responsive device reacts to differences in
1. pressure
  2. heat
  3. humidity
  4. ambient temperature
- 4-54. What action in the snap-action switch prevents excessive arcing across the points?
1. Closing only
  2. Opening only
  3. Slow opening and closing
  4. Fast opening and closing

- 4-55. Every electric switch is designed so it has a specific rated capacity in
1. ohms and coulombs
  2. coulombs and amperes
  3. amperes and volts
  4. volts and coulombs
- 4-56. The standard controls furnished for automatic fuel-burning equipment come in sets designed for warm-air, hot-water, and steam-heating systems.
1. True
  2. False
- 4-57. What is the nerve center of the heating control system?
1. Humidstat
  2. Thermostat
  3. Essostat
  4. Ergostat
- 4-58. What types of thermostats are used most often in heating control systems?
1. Mercury bulb and electric clock
  2. Electric clock and spiral bimetallic
  3. Programmable and electric clock
  4. Spiral bimetallic and mercury bulb
- 4-59. The best location for a thermostat is on an inside wall and approximately how many feet from floor level?
1. 1 1/2
  2. 2 1/2
  3. 3 1/2
  4. 4 1/2
- 4-60. To check the calibration of a thermostat, you should allow what amount of time for the thermostat and a test thermometer to adjust themselves to room temperature?
1. 5 to 10 minutes
  2. 10 to 15 minutes
  3. 15 to 30 minutes
  4. 30 to 45 minutes
- 4-61. You do not have to recalibrate a thermostat if its closing point does not exceed that of the test thermometer by 1°F.
1. True
  2. False
- 4-62. When installing a furnace, you should use what tool to ensure that it is level?
1. Float level
  2. Spirit level
  3. Dumpy level
  4. Locke level
- 4-63. Gas-fired and oil-fired forced air units with the blower below the heating element should be setting on masonry at least 3 inches thick and extending what minimum distance beyond the casing wall?
1. 6 inches
  2. 9 inches
  3. 12 inches
  4. 18 inches

4-64. When ventilating the furnace room to supply air for combustion, you should allow what size opening for each 1,000 Btu per hour of furnace input rating?

1. 1 square inch
2. 2 square inches
3. 3 square inches
4. 4 square inches

4-65. To ventilate a furnace room adequately, you should install what total number of louvered openings?

1. One
2. Two
3. Three
4. Four

4-66. You should use what size and type of tubing from the oil tank or valve to the burner?

1. 1/8-inch copper
2. 1/4-inch copper
3. 3/8-inch seamless steel
4. 1/2-inch seamless steel

4-67. The suction and return lines for an underground fuel tank should be constructed of

1. black iron
2. P V C
3. copper tubing
4. seamless steel

4-68. Which of the following physical conditions does NOT have to be attained to ensure complete and efficient combustion of fuel-oil systems?

1. The mist must be thoroughly mixed with sufficient combustion air
2. The liquid must be thoroughly vaporized
3. Flame propagation temperature must be maintained
4. Primary combustion air must be admitted to the furnace through the casing surrounding the burner

4-69. Atomization of fuel oil is not accomplished by

1. using steam to break the oil into droplets
2. forcing oil under pressure through a suitable nozzle
3. passing an oil film through an annular groove and into a nozzle spray tip
4. tearing an oil film into tiny drops through centrifugal force

4-70. Steam-atomizing and air-atomizing burner nozzles are both classified as what type of nozzle?

1. Internal or external mixing
2. Centrifugal or centripetal
3. Static or dynamic
4. Open or closed



4-71. What is the required pressure range for the steam in a steam-atomizing burner?

1. 75 to 150 psi
2. 65 to 90 psi
3. 55 to 80 psi
4. 45 to 70 psi

4-72. What amount of air pressure is required to carry light oil to the burner tip of an air-atomizing burner?

1. 10 psi
2. 15 psi
3. 20 psi
4. 25 psi

4-73. In a mechanical atomizing burner, good atomizing results at what pressure?

1. 100 psi
2. 200 psi
3. 300 psi
4. 400 psi

4-74. Which of the following types of burners atomizes fuel by tearing it into tiny droplets?

1. Steam atomizing
2. Air atomizing
3. Mechanical atomizing
4. Horizontal rotary-cup

4-75. What is the speed of a motor-driven conical or cylindrical cup in a horizontal rotary-cup burner?

1. 2,450 rpm
2. 3,450 rpm
3. 4,450 rpm
4. 4,850 rpm